



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/533,091  | 04/28/2005  | Hideya Kumomi        | 03500.017731        | 2294             |
| 5514 7590 03/21/2008<br>FITZPATRICK CELLA HARPER & SCINTO<br>30 ROCKEFELLER PLAZA<br>NEW YORK, NY 10112 |             |                      |                     |                  |
| EXAMINER  |             |                      |                     |                  |
| ROMAN, ANGEL  |             |                      |                     |                  |
| ART UNIT  |             | PAPER NUMBER         |                     |                  |
| 2812  |             |                      |                     |                  |
| MAIL DATE   |             | DELIVERY MODE        |                     |                  |
| 03/21/2008  |             | PAPER                |                     |                  |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/533,091

**Applicant(s)**

KUMOMI ET AL.

**Examiner**

ANGEL ROMAN

**Art Unit**

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 and 31-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 31-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/888)
- Paper No(s)/Mail Date 12/26/07.
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The references cited in the information disclosure statements filed 12/26/07 has been considered by the examiner.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 35-37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. The term "such an interval" in claims 35-37 is a relative term which renders the claim indefinite. The term "such an interval" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. An interval of the specific amorphous regions has been rendered indefinite by the use of the term "such an interval".

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-5 and 31-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Cheng et al. US 6,432,758 B1 filed 02/13/2001.

Regarding claim 1, Cheng et al. discloses a method for producing a crystalline film by melting and resolidifying a film (204) comprising the steps of: preparing a film having a specific amorphous region obtained by a step of forming a film in which a specific amorphous region and a peripheral amorphous region continuous to a periphery of the specific amorphous region and different in thickness from the specific amorphous region co-exist, melting at least a part of the film so that a single crystal grain or a single cluster remains unmelted in the specific amorphous region; and resolidifying the film (see Abstract).

Regarding claims 2 and 3, Cheng et al. discloses preparing a film by forming a concave portion (207') on a surface of the film and the substrate (see figure 5).

Regarding claim 4, Cheng et al. discloses a step of forming a film (204) in which the specific region (206) has a thickness larger than in the peripheral amorphous region (205) thereof (see figure 5).

Regarding claim 5, Cheng et al. discloses, at a maximum melting state of the film in the melting-resolidification process, a single crystal grain or single crystalline cluster remains unmelted in the specific amorphous region while the peripheral amorphous region thereof is completely melted (see Abstract).

Regarding claim 31, Cheng et al. discloses a spatial position of at least a part of crystal grains having a continuous crystalline structure in the crystalline film is determined by a spatial position of the specific amorphous region (see Abstract).

Regarding claim 32, Cheng et al. discloses element utilizing a crystalline film obtained by a producing method according to claim 1, wherein a spatial position of at least a part of crystal grains having a continuous crystalline structure in the crystalline film is determined by a spatial position of the specific amorphous region, and a crystal grain having the determined spatial position is utilized as an active area (see Abstract).

Regarding claim 33, Cheng et al. discloses using the crystalline substrate to form single crystal devices and forming an active area inside a single crystal grain of the crystalline film (see figure 7).

Regarding claim 34, Cheng et al. discloses using the crystalline substrate to form single crystal devices, and disclosing a circuit including a plurality of the elements, and a wiring between the elements (see figure 7).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al. US 6,432,758 B1 filed 02/13/2001.

Cheng et al. is applied as above but lacks anticipation in comparing a thickness dimension to a crystal growth rate by describing that a ratio of a dimension to a thickness of the specific amorphous region is larger, when a crystal growth of the single crystal grain or the single crystalline cluster existing in the specific amorphous region executes a crystal growth in a resolidification step, than a ratio of a growth velocity in a planar direction to a growth velocity in a direction of film thickness in the specific amorphous region; a ratio of a dimension to a thickness of the specific region is, when a crystal growth of the single crystal grain or the single crystalline cluster existing in the specific amorphous region executes a crystal growth in a resolidification step, within such a range that a growth front in a direction of film thickness reaches a surface of the film before a growth front in a planar direction of the film reaches a periphery of the specific amorphous region; a ratio of a dimension of the specific amorphous region to a thickness difference between the specific amorphous region and the periphery region is

larger, when a crystal growth of the single crystal grain or single crystalline cluster existing in the specific amorphous region executes a crystal growth in a resolidification step, than a ratio of a growth velocity in a planar direction to a growth velocity in a direction of film thickness in the specific amorphous region; or a ratio of a dimension of the specific amorphous region to a thickness difference between the specific amorphous region and the periphery region is larger, when a crystal growth of the single crystal grain or the single crystalline cluster existing in the specific region executes a crystal growth in a resolidification step, within such a range that a growth front in a direction of film thickness reaches a surface of the film before a growth front in a planar direction of the film reaches a periphery of the specific amorphous region. It would have been obvious to a person having ordinary skills in the art at the time the invention was made to describe a relationship between a thickness dimension to a crystal growth rate as stated above, in the primary reference of Cheng et al. since the method and physical characteristics of the crystallization process describe in Cheng et al. would provide similar results and in order to better describe the process by establishing a physical relationship between described elements.

11. Claims 38-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al. US 6,432,758 B1 filed 02/13/2001 in view of Hayafuji et al., US 4,564,403 dated 01/14/1986.



Regarding claims 38-41 and 43-45, Cheng et al. is applied as above but lacks anticipation on disclosing a melting-resolidification process of a film, in melting the film with plural heating means and resolidifying the film; at least one of the plural heating means is heating means having a constant heating intensity without a change with time, in a melting process of the film; the heating means having a constant heating intensity being a heat conduction from a substrate, an irradiation with a continuously oscillated laser light, or a current-supply heating of the film (see figures 12-15); at least one of the plural heating means being heating means having a heating intensity changing with time, in a melting process of the film (see figure 12); the plural heating means including heating means having a constant heating intensity without a change with time in a melting process of the film, and heating means having a heating intensity changing with time in a melting process of the film (see figures 12-15); the plural heating means including heating means which heats the film to a temperature not exceeding a melting point, and heating means for heating the temperature-elevated film thereby melting the film (see figures 12-15); and a step of giving a heat not changing with time to the film thereby heating the film to a temperature not exceeding a melting point, a step of giving a heat changing with time thereby heating and melting the temperature-elevated film, and a step of resolidifying the film. Hayafuji et al. discloses a melting-resolidification process of a film, in melting the film with plural heating means (160A-F) and resolidifying the film (see figures 12-15); at least one of the plural heating means is heating means (160) having a constant heating intensity without a change with time, in a melting process of the film (see columns 5 and 6); the heating means having a constant heating

intensity being a heat conduction from a substrate, an irradiation with a continuously oscillated laser light, or a current-supply heating of the film (see figures 12-15); at least one of the plural heating means being heating means having a heating intensity changing with time, in a melting process of the film (see figure 12); the plural heating means including heating means having a constant heating intensity without a change with time in a melting process of the film, and heating means having a heating intensity changing with time in a melting process of the film (see figures 12-15); the plural heating means including heating means which heats the film to a temperature not exceeding a melting point, and heating means for heating the temperature-elevated film thereby melting the film (see figures 12-15); and a step of giving a heat not changing with time to the film thereby heating the film to a temperature not exceeding a melting point, a step of giving a heat changing with time thereby heating and melting the temperature-elevated film, and a step of resolidifying the film (see columns 5 and 6). It would have been obvious to a person having ordinary skills in the art at the time the invention was made to use the heating and resolidification means taught by Hayafuji et al. to resolidify the amorphous layers in the primary reference of Cheng et al. in order to reduce processing costs.

Regarding claim 42, Cheng et al. as modified by Hayafuji et al. is applied as above and further discloses using laser heating means (see Abstract) but lacks anticipation on using a pulsed laser for irradiating the film with two pulses of different intensities with a time difference. It would have been obvious to a person having

ordinary skills in the art at the time the invention was made to use a pulsed laser for irradiating the film with two pulses of different intensities with a time difference as the heat source in the primary reference of Cheng et al. as modified by Hayafuji et al. in order to provide enough energy for the melting resolidification process and since Cheng et al. already discloses using a time variable heat source, selecting a pulsed lasers is only considered routine optimization of the process already disclosed by Cheng et al.

### ***Response to Arguments***

Applicant's arguments filed 12/26/07 have been fully considered but they are not persuasive. Regarding Applicant's argument that in Cheng et al. the melting step is not performed so that a single crystal grain or a single cluster remains unmelted in the specific amorphous region because Cheng et al. teaches two crystal grains growing from either side that will collapse to form a grain boundary at the central position of region. This is not persuasive because by teaching two crystal grains growth a single crystal grain or a single cluster also remains unmelted in the specific amorphous region. Therefore, the specific region of the present invention does contain a grain boundary as claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., not containing a grain boundary as disclosed in Cheng et al.) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Art Unit: 2812

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANGEL ROMAN whose telephone number is (571)272-6369. The examiner can normally be reached on IFP Mo-Fr 6am-3pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571)272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. R./

Examiner, Art Unit 2812

March 17, 2008

/Michael S. Lebentritt/

Supervisory Patent Examiner, Art Unit 2812